

CLAIMS

1. An electronic ballast for driving at least one gas discharge lamp

from a source of AC power which has a substantially sinusoidal line voltage at a given line frequency, comprising:

a rectifying circuit having AC input terminals and DC output terminals; said AC input terminals connectable to the source of AC power; said rectifying circuit producing a rectified output voltage at its said DC output terminals when said AC input terminals are energized by said source of AC power;

an inverter circuit having input terminals connected to said output terminals of said rectifying circuit and producing a high frequency drive voltage for driving a lamp current through said at least one gas discharge lamp when said AC input terminals are energized by said source of AC power;

and a cat ear circuit connected to said source of AC power, said cat ear circuit being adapted to conduct current for a first relatively short time following a first zero crossing of said line voltage and for a second relatively short time prior to the next zero crossing of said line voltage thereby to reduce the total harmonic distortion of the current drawn from said source of AC power below that which would occur in the absence of said cat ear circuit.

2. The electronic ballast of claim 1, wherein said cat ear circuit further comprises a cat ear power supply.

3. The electronic ballast of claim 1, wherein said cat ear circuit draws current from said source of AC power only when the instantaneous value of said line voltage is less than a predetermined absolute value.

4. The electronic ballast of claim 1, wherein said cat ear circuit draws current from said source of AC power only when the current drawn by said inverter circuit from said source of AC power is substantially zero.

5. The electronic ballast of claim 1, wherein said cat ear circuit draws current from said source of AC power at least when the current drawn by said inverter circuit from said source of AC power is substantially zero.

6. The electronic ballast of claim 2, wherein said electronic ballast includes an auxiliary circuit coupled thereto which has an auxiliary circuit power supply input terminal; said cat ear circuit coupled to and driving said auxiliary circuit power supply input terminal.

7. An electronic ballast for driving at least one lamp comprising:
a rectifying circuit operatively connectable to an AC line;
a current drawing circuit connected across said rectifying circuit; and
an inverter circuit connected to said rectifying circuit that supplies a lamp current to said at least one lamp;
wherein said current drawing circuit draws current from said AC line when the instantaneous voltage of said AC line nears zero to reduce the total harmonic distortion of the input current drawn by said ballast.

8. The electronic ballast of claim 7, wherein said current drawing circuit is a cat ear circuit.

9. The electronic ballast of claim 8, wherein said cat ear circuit draws current from said AC line between predetermined cut-in and cut-out points.

10. An electronic ballast for driving at least one lamp comprising:

a rectifying circuit operatively connectable to an AC line;

a valley fill circuit including a capacitor;

said valley fill circuit operable to selectively charge said capacitor from said rectifying circuit through an impedance and a first electronic switching device; and

an inverter circuit including at least one electronic switching device for supplying lamp current to said at least one lamp;

wherein said capacitor is charged during at least 90° of each half-cycle of said AC line.

11. The electronic ballast of claim 10, wherein said valley fill circuit includes a buck converter circuit.

12. The electronic ballast of claim 10, wherein said valley fill circuit includes an inductor.

13. The electronic ballast of claim 10, wherein said first electronic switching device is a MOSFET.

14. The electronic ballast of claim 10, wherein said valley fill circuit includes at least one of said at least one switching device of said inverter circuit.

15. The electronic ballast of claim 10, which further includes a flyback transformer coupled to said capacitor, to control the delivery of energy to said capacitor.

16. The electronic ballast of claim 15, wherein said flyback transformer is connected to said capacitor by a controllably conductive device.

17. An electronic ballast for driving at least one lamp comprising:

a rectifying circuit operatively connectable to an AC line;

a valley fill circuit including an energy storage device;

said valley fill circuit operable to selectively charge said energy storage device;

a back end which includes an inverter circuit that supplies a lamp current to a lamp;

a control circuit for controlling the operation of said inverter circuit; and

a cat ear circuit that supplies power to said control circuit and wherein said inverter circuit draws a first current from said AC line during a predetermined portion of each half cycle which is greater than 90° of each half cycle of said AC line.

18. An electronic ballast for driving at least one lamp comprising:

a rectifying circuit operatively connectable to an AC line;

a valley fill circuit including an energy storage device; and

said valley fill circuit operable to selectively charge said energy storage device from said rectifying circuit through an impedance and a first electronic switch.

19. The electronic ballast of claim 18, wherein said energy storage device is a capacitor.

20. The electronic ballast of claim 18, wherein said impedance is an inductor.

21. The electronic ballast of claim 18, wherein said impedance is a resistor.

22. The electronic ballast of claim 18, wherein said first electronic switch is a MOSFET.